BÖHM-BAWERK ON RAE.

An attempt to comment in detail on Böhm-Bawerk's exposition and criticism of Rae's theory of capital* would be contrary to my present purpose. I believe that Rae's work is an important light on the whole subject of capital; and I regard both Böhm-Bawerk's criticism and the prestige of his *Positive Theory* as having the effect of obscuring that light. Accordingly, notwithstanding the title of my article, I wish to undertake in the main not a formal rejoinder to Böhm-Bawerk's handling of Rae, but a fresh comparison of the two authors.†

At least externally and negatively there is, indeed, a striking resemblance between the two investigators. Viewed especially with regard to the errors they avoid in their preliminary concepts, and with respect to their common spirit of revolt against much of the old tradition, they form a group remarkable for its detachment. But a close inspection of the group reveals that internally and positively it is rent asunder; that Böhm-Bawerk and Rae are representatives of two distinct types of speculation on capitalistic phenomena; that they are spokesmen for two very different classes of capitalists. The one puts forward a theory of the system of division of employments to which the forms of concrete capital, arranged in a series according to their rank or stage of development, are incidental; the other, a theory of the tool or machine in its most inclusive sense, to which the system of division of employments and its concomitants is incidental.‡

*Chap. xi. pp. 375–428, of the second edition of the *Geschichte und Kritik der Capitalzins-Theorien*. Innsbruck, 1900.

† I plead guilty to the charge that to a considerable extent on a former occasion I read Böhm-Bawerk into Rae, and that I represented a greater likeness to exist between them than is actually the case. (See *Geschichte*, pp. 424–427.) In defence I urge that at first, with less perfect understanding than comes with prolonged study broken off and renewed at intervals, it was natural that resemblances rather than differences should have struck my attention. But the very fact of these errors, and others, makes fitting a reopening of the whole subject.

‡ "Capital is nothing but the complex of intermediate products which appear on the several stages of the roundabout journey" of production.

"Capital has, first, a symptomatic importance. Its presence is always the symptom of a profitable roundabout production. I say deliberately 'symptom,' and not 'cause' or 'condition' of profitable methods of production; for, as a fact,

The one emphasizes the passive forces — the conditions — of interest and existing business; the other, the active forces — the creation — of profit and progress. The one presents, in short, a philosophy of capital which is mercantile; the other, one which is industrial.*

As a preliminary aid to the detailed discussion and comparison of the individual theories of Rae and Böhm-Bawerk, the general subject of capital may be divided into two branches: —

(A) The general and progressive material betterment of men and nations arising from the use and improvement of capital; and

(B) The particular gains of the individual owners of capital; which last may be again divided into two branches:—

(C) The problem of the emergence of pure capital earnings or interest,— why there is any such gain at all obtainable by capitalists; and

(D) The problem of the variation of the rate of profit or interest, for short periods as well as long periods, supposing there is a rate established in a market. And this in turn has two aspects: —

(E) The technical side,— the side of the resistance of physical nature and the counteracting forces of progress in the arts,— the side of utility of and demand for capital; and

(F) The psychical side,— the side of resistance of human nature and the counteracting forces of ambition,— the side of disutility and supply of capital.

its presence is rather the result than the cause. . . . It is, secondly,— and herein lies the chief point of its productive efficiency [that is, significance in production],— an effective intermediate cause of the consummation of this profitable roundabout process." *Positive Theory*, pp. 22 and 92, respectively.

Compare Rae, *Principles*, Book II. chap. viii.,— "Of the Division of Employments, and of Other Phenomena Produced by Efforts to accelerate the Exhaustion [Functioning] of Instruments." See also p. 408.

* "What, then, are the capitalists as regards the community? In a word, they are merchants who have present goods to sell."

"The exchange of present goods for future, in which interest has its origin, is only a special case of the exchange of goods in general." *Positive Theory*, pp. 358 and 375, respectively.

Compare Rae, *Principles*, Book II. chap. i.,— "It is Characteristic of Man to Provide for the Wants of the Future, by the Formation of Instruments; and his Power to make this Provision, is Measured, by the Extent and Accuracy of his Knowledge of the Course of Natural Events."

The first head of this analysis (A), as Böhm-Bawerk himself points out several times in the course of his criticism, is the chief concern of Rae. To a much smaller extent is Rae concerned with (B) and (C), and to an even less degree with (D) and its two sub-branches. From this division of attention the chief shortcoming of his work, considered as a treatise on the whole subject of capital, arises. He is so intent on demonstrating the what and why of the capitalistic gains of society that he comes near overlooking the fact that, generally, those gains are, in the first instance, the gross profits of individual *entrepreneurs*. Especially is it a defect in his teaching that the personal net-profit-seeking motives and activities of *entrepreneurs* as such are subjects the specific treatment of which is almost wholly neglected. But, after all, these defects of distribution of emphasis are errors of omission only; Rae's "unevenness of treatment" does not involve "logical leaks," "incongruities," and "contradictions" in his theory of capital, as Böhm-Bawerk maintains.*

The charge of "unevenness of treatment" may also, I think, be brought against Böhm-Bawerk himself, and for a like reason. Although writing a systematic treatise, designed to cover the whole ground of the subject of capital and interest, he concentrates his attention and that of his readers on our analytic head (C),— on the problem of the emergence of interest. The problem of the rate of interest (D) is treated late in his work, and with far less thoroughness and positiveness than the subjects which precede it.

In contrast with both Rae and Böhm-Bawerk, it is worth noting here, Ricardo directed his attention to head (D) — the problem of the rate of profit — to the total neglect of the problem of its emergence (C), notwithstanding the fact that, obviously, one is logically called upon to solve the latter before taking up the solution of the former. That Ricardo completely passed by the problem of emergence of interest,— probably, indeed, never recognized that it existed,— Böhm-Bawerk has most clearly demonstrated; † and that his handling of the subject of the rate of profit was not a happy one will appear in some measure in the following pages.

* *Geschichte*, p. 409.

† See *Capital and Interest*, Book I. chap. v.; and *Geschichte*, chap. vi.

According to Böhm-Bawerk the "greatest and the most tantalizing difficulty of the whole problem of interest" is to discover the "middle terms" (*Mittelglieder*) through which the technical and psychical "causal factors" are joined together in the determination of the actual rate of return on capital. These connecting links he finds in the elements which go to make up the persistent market phenomenon "that present goods are more highly valued than future goods." That is to say, this latter *Zwischenglied* is the net result of two "part-causes," the "psychological facts," on the one hand, and, on the other, the "technical productivity" of those roundabout methods of production which we are enabled to undertake through the possession of present goods. This last characteristic of present goods — that through them alone we can seize the industrial opportunity, and that for them that opportunity always exists — is what is called in the *Positive Theory* "the technical superiority of present goods." * At the time of writing my earlier criticism, this principle of "technical superiority of present goods" seemed to me superfluous; but I now admit that it is an essential feature of Böhm-Bawerk's total theory of interest,— a theory which he himself characterizes as the "*agio* theory."

Ricardo, also, as Böhm-Bawerk notices in a later passage of the *Geschichte*, made use of "middle terms," to connect the members of his theory of profit. In his earlier work — the *Essay on the Influence of a Low Price of Corn on the Profits of Stock* — Ricardo attempted to join the newly discovered principle of diminishing returns in the cultivation of land directly with the general rate of profit. This procedure was unsatisfactory (for reasons to be pointed out later); and accordingly (getting meanwhile a suggestion from Torrens) in his *Principles of Political Economy and Taxation* he elaborated a truly remarkable series of middle terms. Given

* *Geschichte*, p. 407. Compare *Positive Theory*, p. 227 note. I have difficulty in reconciling this doctrine of a middle term made up of two sorts of elements (one psychological, the other technical) with the following statements on page 268 of the *Positive Theory:* "The superiority *in value* of present means of production, which is based on their technical superiority [productivity?], is not one borrowed from these circumstances [*i.e.*, the psychological factors affecting the relative valuation of present and future goods]: it would emerge of its own strength *even if these were not active at all.*" The Italics are mine.

increased difficulty in the marginal cultivation of the soil, Ricardo maintained, the price of food rises; consequently, to purchase a real wage, habitually at the subsistence level because of the Malthusian law of population, the money wages of labor rise; and thus, finally, as the immediate result of the general rise of money wages, the general rate of profit falls. Contrariwise, when improvements in agriculture turn back the law of diminishing returns, the price of food falls, the numbers of the laborers increase, money wages fall, and, consequently, general profits rise. For any explanation of a rise in profits during a period insufficient in duration for any possible increase of the numbers of the laboring population, one may search the pages of Ricardo in vain. And yet the Ricardian theory of profits satisfied, on the whole, most English economists for two generations! The fact that Ricardo took for granted the existence of some rate of profit on capital is by no means his most serious shortcoming.

In Rae's teaching on capital and its earnings we find no trace of middle terms; and, indeed, there seems to be no place for them. In the opinion of the present writer the whole subject of profit, both as regards its emergence and its rate, can be treated in a thoroughly adequate manner without the use of middle terms, provided one first works out (as did Rae) the technical forces of action and resistance to general principles governing the demand for capital, and the psychical forces of action and resistance to general principles governing the supply of capital; and provided, further, one admits cost as well as utility to have a place in one's theory of value.

And now to address ourselves directly and simply to the crucial problem of the philosophy of capital. Why does the standard rate of interest in the industrial community suffer variation? Why at one time does interest fall, why at another does it rise?

Interest falls, primarily, from an increase of savings,— accumulations,— would-be capital, relatively to the field of investment,— the means of embodiment of would-be capital in real, concrete capital,— the opportunities of exploitation through the agency of capital. And, contrariwise, interest rises in the first instance from a decrease of savings relatively to those

things which constitute the field of investment,— the outlet or vent of savings. These ups and downs of the savings market are themselves caused, obviously, by changes either on the side of savings or on the side of field of investment; and they continue during longer or shorter periods of time. Thus, with all these primary and secondary elements of the problem in view, the answer to our question is that interest falls during long periods of years ultimately and positively because of increase of strength of the effective desire of accumulation; and it rises during long periods (in this instance a matter of generations and centuries rather than of decades) because of decrease of the strength of the effective desire of accumulation. For short periods, interest falls from disorders affecting the field of investment or from an abnormal activity of the accumulative principle; and it rises from bursts of discovery and invention,— from rapid advance in general industrial and commercial efficiency. Interest is hardly likely to rise or continue stationary at a high point for considerable periods of time from this latter cause, owing to the fact that the new wealth created by the inventions and discoveries so vastly increases the savable fund. In a developed and healthy society much of what is savable is actually saved, and a lower standard rate of interest than obtained before the era of invention will come about as the final result. Only in case the era of invention kept repeating itself, and with constantly increasing intensity (or in case, as Adam Smith supposed, the high interest should break down the *morale* of the capitalist classes and cause reduction of savings), would this cause have the effect of raising the rate of interest for a long series of years. Increase of savings and capital for longer or shorter periods, with great activity of invention and rising interest,—“ augmentation of stock,”— is the most desirable state of affairs. Increase of capital, with relative absence of invention and consequently with falling profits,— “ accumulation of stock,”— is less desirable; it is the mark of a highly developed, ambitious, but relatively stagnant civilization. Decline of capital, with rising interest and retrogression of the arts, is manifestly least desirable; it characterizes a decaying civilization. According as the movement of the rate of interest up or down, for longer or shorter periods, comes

from activity of forces on the psychical side or on the technical side, the actual rate may be said, in the one set of cases, to be determined by the "accumulative principle," in the other set, by the principle of "productivity" of capital.

This is in outline a theory of the rate of interest which may *be fairly called* Rae's theory; although the terminology is somewhat different, and the problem is approached from a different side. Rae himself, for the most part, omits consideration of the market; and, so far as he does deal with it, he contemplates the market for formed capital ("instruments") rather than the market for would-be capital or savings. He was apparently actuated throughout by a desire to put the phenomena of capital of an "economic category" (as we now say) in the foreground, and to subordinate the phenomena of an "historical category." For this reason, because he was rather too industrial and not enough mercantile, his theory of interest does not stand forth from his pages as clearly as it otherwise might.

To build still further upon the basis Rae gives us, let us take one step more, and bring in the concept of the margin. The market for savings at any time is governed from the side of demand strictly by the profit-gaining power of marginal exploitation, not by the total productivity of capitalistic industry. In other words, what fresh savings after being metamorphosed into capital can earn in their least profitable uses at the hands of *entrepreneurs* determines what can be offered for them in the shape of interest. This margin of the uses of capital, however, is a broad margin, not one single industry nor mode of use. Likewise, the savers of a community, not being a homogeneous body as regards their motives and pecuniary circumstances, it is the marginal, not the total, effective desire of accumulation which governs the market for savings at any time from the side of supply. A certain rate of interest is the "cost" price which must be paid to marginal savers in order to call forth the last increment of savings.* Nevertheless, that which in the long run "bears" the market

*Obviously, in these circumstances, at any time the intra-marginal *entrepreneurs* are making varying amounts of *entrepreneurs'* rent on their borrowings; and the intra-marginal savers are making varying amounts of savers' rent. These two

for savings, and thus reduces the rate of interest and brings successively fresh classes of marginal savers into play, is the growth of the total effective desire of accumulation of the community. It is the total pressing forward of savings all along the line meeting with diminishing returns all along the line, when they seek to embody themselves and functionate, which results in a lower standard rate of interest. In the opinion of the present writer, much has been lost as well as gained in the handling of the larger problems of the science by our present practice of regarding the marginal and temporary to the neglect of the total and permanent.

Turning now to an examination of Böhm-Bawerk's theory of the determination of the rate of interest, how does he answer the question,— why does the rate of interest fall; why does it rise? The rate of interest falls during long periods — it has, in fact, a long-run law of decline — because, with the increase of capital, the production process is lengthened, and at the same time its technical results diminished. You have to wait longer for the product, you incur a greater sacrifice of time, and the product is relatively less when you get it. It is recognized that it is only beyond "a certain point" that the surplus of products received over products laid out declines as the "production period" is extended. It is further recognized that this "point" is indeterminate; that the ratio of decline beyond it is also indeterminate; and that the total production process is composed of "branches," having each its own scale of results as its "period" is prolonged. But it is not recognized that any philosophical explanation need be given as to why there is any diminution in the returns of the average production process beyond any point and in any ratio. The resistance which the general pushing forward of investment meets with — a subject of great importance and difficulty in the science — is passed over with the assertion that it is "based on experience," and that it "must be taken as a fact of the technique of production." * And, on the other

sorts of rent are suggested, but no more than barely suggested, by Rae, *Principles*, pp. 175 and 196 and 198, 199, respectively.

For an indication of the basis of the theory of savers' rent in the *Positive Theory*, see p. 279.

* *Positive Theory*, pp. 82–87. Compare pp. 402–406.

hand, as to why in the long run capital increases progressively (and so presses down ever more and more the margin of its use, and with that the rate of its earnings) I cannot find, in contrast with Rae's performance, that any thorough-going explanation has been given. Apparently, with Böhm-Bawerk, capital increases (in Ricardian phrase) "with the progress of improvement," simply because with greater wealth it becomes easier to save. The conditions — the economic circumstances — progressively favor actual saving; but what the essential, dynamic force behind the act of saving is, we are not informed.

But how does Böhm-Bawerk account for temporary changes in the rate of interest upward and downward, as contrasted with the long-run movement? In a word, he does so by means of the doctrine of the *agio* in favor of present goods,— the opportunities of investment of the "general subsistence fund,"— a line of argument set forth towards the end of his work, and which is not a little perplexing to one trained in the English classical tradition. In some respects it is very similar to the teaching of the Ricardians, in others very dissimilar.

Three principles are developed in the Fifth Book,—" Want and provision for want," "Underestimate of the future," and "Technical superiority of present goods,"— which lead up to and support the generalization that "to the overwhelming majority of men the subjective use value of present goods is higher than that of similar future goods." The first two principles work with a "cumulative" force; but the third operates "alternatively," — that is, it "levels up" individual subjective valuations. From this it is but a step to regarding the third principle as alone playing a dominating part in the valuation of present goods, and this step is soon taken. But for the present the other factors are still kept in contemplation. With reference to all three principles it is said, "From this relation of subjective valuations there follows, in the market generally, a higher objective exchange value and market price for present goods." * . . .

In the following Book, however, we read that for "capitalists" it is "positively advantageous" to have an opportunity

* *Positive Theory*, pp. 273, 277, and 281.

"to change a part of their resources into future goods of some kind or other. In other words, if we look only at the relations of want and provision for want in present and future, present goods, as such, are worth even less than future to the owner[s] of a stock of wealth which is greater than his [their] present wants. . . . Nor can the underestimate of future wants form a reasonable basis," in respect to such persons, for present goods having any advantage in value over future goods. "It will seldom be strong enough to outweigh the counteracting consideration of the overabundant provision for the present, and to prevent the capitalists from preferring to employ part of their wealth in the service of the future. . . . Of the three considerations, which as we have seen generally serve as foundation for the preference of present over future goods, the first two do not apply as regards the great majority of capitalists. It is our third consideration, the well-known technical superiority of present goods, or, as it is usually called, the 'productivity of capital,' which is decisive with them." And a few pages further we are assured that, "as regards modern circumstances, to the capitalists, the subjective use value of present goods is not greater than that of future goods." And still again, in a later passage, it is stated that, "in the subjective circumstances of the capitalist, a sum of present goods" is, "as a rule, worth as much as the same sum of future goods." *

The psychological principles — the really subjective grounds — for an *agio* in favor of present goods are therefore excluded from having any definite force with respect to a very considerable part of the community. And, accordingly, the summing-up statement at the end of Book V. should be altered to read, "To the overwhelming majority of men," not capitalists, "the subjective use value of present goods is greater than that of similar future goods." But, thus altered, the statement sounds much like a truism; for it is, of course, precisely for this reason in the last analysis (as any exponent of the old abstinence theory would maintain) that the numerical majority of men are not capitalists.

On this showing, then, how does the whole matter of relative subjective valuation of present and future goods connect it-

* *Positive Theory*, pp. 315, 316, 330, and 382.

self with the phenomenon of interest? It connects itself, upon Böhm-Bawerk's representation, through the majority of men not capitalists,— in short, the laborers. They live intellectually in the present, and discount the future heavily; they are in adverse circumstances in respect to want and provision; they, in short, are constantly in urgent need of present goods, and thus their necessity is the capitalists' opportunity. The capitalist — a merchant in present goods — sells them advances in return for their labor power; he sets with that power a roundabout technical process in motion; the future product is his, and thereby he reaps his profit. This "profit" (a "surplus value") actually emerges in two ways, or, rather, is realized as the combined result of two circumstances. The present goods paid as wages to labor are metamorphosed by the rouudabout technical process (if "well chosen") into a larger quantity of future goods; and, when these "future goods" arrive, they then enjoy the favorable *agio* of "present goods."

The whole set of conditions here described, thus acting together, establishes, under the law of competition, a regular market rate of interest. This gain of interest regularly obtained from a market situation perpetually repeated, not by reason of risk, not as a wage of management, is simply a marginal rent on the ownership and employment of capital: it is by no means a "reward of abstinence" or the compensation for any sort of cost to the capitalist.* Senior has been answered. He has been answered by substituting for the abstinence theory the socialistic exploitation of labor theory slightly modified. The modification consists in pointing out that with respect to

*On a former occasion (*Quarterly Journal of Economics* for April, 1899, xiii. No. 3) I supposed that to admit that a large part of interest was an intra-marginal rent, and to hold that only marginal capitalists received strictly a "reward" for a real cost of saving,— a payment for anything approaching a "downright privation" involved in accumulation — was to meet Böhm-Bawerk half-way, and to obviate his objection to the "abstinence theory" of interest. I was led to this opinion in part by the apparent bearing of certain passages on "saving" early in the *Positive Theory* (see especially pp. 102 and 120, 121), and in part by what I then took to be the meaning of Böhm-Bawerk's teaching on present and future. I now see that I was wholly mistaken. There is no room in the "*agio* theory" for such reconciliation, because there is no recognition of any causal force from the side of supply acting on the emergence of interest. The forces causing valuation of savings or capital are wholly reflected from the side of demand for capital or savings.

the laborers, because of their relative valuation of present and future goods, their labor is not really bought "cheap"; that it is a fair bargain which is made; that they have themselves and the "technique of production" to blame for the conditions which enable the capitalist to get his interest.*

Now it is obvious that the fact of the existence of a great body of impecunious laborers, who are willing to sell the future fruits of their labor for present goods, makes possible the wage system; and the wage system, in turn, makes possible the organization and direction of industrial forces by the most capable members of the community; and, finally, this power of direction makes possible the earning of interest by a vast mass of capital which could not otherwise exist and functionate. In other words, the existing phenomena of capital, interest, and the savings-market, could not emerge without the concomitant emergence of proletariat, wages, and the labor market.† Nevertheless, it is viewing the whole subject on one side, and that not the more important side, to put the "subsistence fund," in Ricardian fashion (not the "instrument," in the fashion of Rae), in the foreground, and thus to represent interest as mainly a matter of the purchase and sale of labor. The capitalist, or his representative, is not only an employer-merchant, but also an engineer. The main thing he does is to exploit nature. According to Rae's way of regarding the matter, the capitalist uses "materials" and "labor" (an analogue of "materials") to form "instruments," by means of which the forces of nature are subjugated to the economic advancement of our common civilization.

But in all this we have been dealing chiefly with the emergence of interest. We have not yet come to close quarters with the leading question before us: How does Böhm-Bawerk explain temporary variations in the rate of interest? Only one course remains open to him, as is obvious from our preliminary discussion; and that is to resort to purely hypo-

* See *Positive Theory*, pp. 301 and 337.

† Of course, capital and interest might emerge to some extent (as Böhm-Bawerk points out) in the absence of a labor market, through operations in other markets, such as the market of the "uses of land" and the "loan" market. But this sort of thing, which obtained in the Middle Ages, is a small matter in comparison with other existing phenomena.

thetical changes in respect to demand for and supply of savings. "Suppose," we read, "that in our community the stock of wealth in the market, as supply, amounts to £1,500,000,000, and that there are 10,000,000 of wage-earners. . . . At a wage of £50 the six years' production period proves the most profitable. It gives an interest of 10 per cent. on the invested capital, while a five years' process would return only 9.6 per cent., and a seven years' 9.7 per cent. Moreover, as at that wage £1,000 employs 6⅔ laborers, the entire ten million workers and the entire fifteen hundred millions of capital find employment; and the point is reached where the formation of price may come to a rest." And again: "Assume that, other circumstances remaining unchanged, the available subsistence fund amounts, not to £1,500,000,000, but to £2,400,000,000. The repetition of the same calculation as made above leads us to the conclusion that the equilibrium of the market cannot now be attained otherwise than by an eight years' production period, a £60 rate of wages, and a corresponding interest rate of 3.54%." And, finally, "Assume, conversely, that the available subsistence fund amounts only to £1,000,000,000, the equilibrium, as will be seen from Table IV., is attained at a rate of wage of £42 [a production period of either four or five years], and an agio of 19.048 %." *

These examples are but illustrations of the *modus operandi* by which in actual economic life varying standard rates of interest are established. No objection can reasonably be urged to the use of arbitrary numbers and tabular relationships of numbers: our criticism must be directed to the principles behind the quantities so dealt with, which constitute the real demonstration. Let us first ask, therefore, what principle determines the availability of subsistence fund for capitalistic outlay at any time,—what regulates the more or less of the supply of savings. The answer is, the principle of "harmonious satisfaction of present and future" worked out in the last chapter of the *Positive Theory*.† This principle is in

* *Positive Theory*, pp. 382, 390, 396 and 397, 398.

† People acting intelligently and with self-control, not only "save" enough to put the present and the future on a level as regards provision for want, but the "existence of interest" induces with them an additional current of saving, so that the provision is a "gradually augmenting one." See p. 415.

some sort a counterpart of Rae's principle of effective desire of accumulation; but it seems to me that from the nature of the elements of which it is constructed it cannot possibly have sufficient flexibility to be of any use in demonstration of the causes of temporary fluctuations in the rate of interest, and that is the problem before us.

On the side of demand for subsistence fund, alteration of the conditions of the market, according to Böhm-Bawerk, may arise from changes in two factors. First, the numbers of laborers may change; and, secondly, there may be a change in "the scale of surplus returns" of different production periods,—that is, the "state of productivity" of capitalistic outlay may change. Other things remaining the same, it is maintained that, if laborers increase in number, the "production period" will be shortened, and, corresponding to its increased "last" or marginal surplus return, the rate of interest will rise, and *vice versa.** What principle determines the number of wage laborers, whether it is a law of increase of population or more or less saving by laborers, so that a larger or smaller proportion of the population is willing to work for wages, I do not find to be definitely stated.

Finally, in respect to the second factor influencing the demand for capital, it is asserted that "it is an acknowledged empirical fact that the discovery of new and more productive methods of production, outlets, business opportunities, etc., which conduce to check the fall of surplus returns, tend to raise the rate of interest; while the closing of former opportunities of production or sale, or other occurrences which end in a reduction of the previous degree of productiveness, tend to lower the interest rate." Of course, other things remaining the same, an increase of the productiveness of industry to an appreciable degree will not merely "tend" to raise the rate of interest, but will actually raise it.† It is also pointed out, one must recall, in the earlier part of the *Positive Theory*, that nothing is fixed and determinate as regards "the amount of surplus result connected with any definite length of process,"

*Also, with changes in the number of laborers the wage of labor changes, as well as the length of the production period; but this seems to be a subordinate consideration.

† *Positive Theory*, pp. 400–402.

irrespective of the "technical circumstance of each branch of production," and the "stage of productive skill," which data are altered by "every new invention." *

It should not be hastily concluded, however, that in these statements we have at least the germ of the principle of invention (such as is thought out and applied by Rae) which could have been amplified and developed by Böhm-Bawerk into a completed doctrine, had he taken the time for it or had his attention not been drawn in other directions. In the footnote appended to the passage last cited, we are informed that "inventions, so called, generally mean the discovery of a new and more productive method of production," and that "frequently, *probably in most cases*, the new way is *longer* than the old; and in this case to utilize the invention required the making of a great number of intermediate products." † This note suggests the key to Böhm-Bawerk's difficulty; and that is, that he had irretrievably cut himself off from appreciation of "invention" at the start by certain fundamental concepts respecting the nature of the capitalistic process of production. The assumption is made in a philosophical way that in industry in general there is some sort of technical efficacy in time itself,‡ just as, in a practical way and in respect to the particular industry of maturing liquors, we naturally regard time as the thing which accomplishes the desired result: whereas, in fact, it is the chemical action which takes place during that time. Moreover, the process of production being conceived of by Böhm-Bawerk too much as a series of industrial operations, as a system of successive division of employments, without sufficient regard to what actually takes place in each separate member of the series, it is assumed that there is some sort of technical efficacy in the mere multiplication of the members of the series.

I may make my meaning clearer on both these heads by quoting the words of a recent writer who was presumably influenced by Böhm-Bawerk in this matter: "Capital is the result of saving; but the saving of which it is a result is not mere non-consumption, but rather a positive modification of

* Pages 85, 86. † The Italics are mine.

‡ See *Geschichte*, p. 426,—"dass der Dauer des Werdeprocesses der Güter ein ursächlicher Einfluss auf die Grösse des technischen Products zukommt." . . .

the method of production which, by *permitting longer periods*, greater specialization, and *more serial methods*, increases both capital and the product." * Rae would say that this is a correct notion of social "saving" as distinguished from individual "acquisition"; but he would urge that capital and the product of capital increase by a modification of the process of production which, in its various branches, often requires (rather than permits) "longer periods" and "more serial methods." According to his way of reasoning, all processes of production characteristic of man are capitalistic; that is, they are carried on through the instrumentality of capital goods, the functioning of which — the giving off of their "events" — is production.† This process of production of economic utilities requires time, since all events necessarily take place during a longer or shorter lapse of time. But this fact of sacrifice of time is in itself wholly a drawback and impediment: there is no positive causal relationship between it and the result achieved, no necessary consonance of more or less time with more or less product. There is a causal relationship between the time element in production and the formation of economic classes, because of the varying disposition of man in respect to waiting. In other words, the positive significance of time in economics is psychical rather than technical.

Again, to utilize a costly and complicated stock of instruments to advantage, according to Rae's teaching, necessitates, indeed, a system of exchange and division of employments,— it involves "serial" production; but this, too, is a necessary evil, since it occasions much delay and miscalculation and all that waste from overproduction in one place and underproduction in another place which is ever the price we pay for its advantages. Only the greater efficiency of instruments — which, on the whole, is the result — makes us accept it.‡ The

* Article on "Production," by E. V. Devine, Palgrave's *Dictionary*, vol. iii. p. 214. The italics are mine.

† "Production" proper, as I understand Rae, is the yielding of final utilities by capital goods or instruments: the functioning of an instrument which yields only another instrument is production in a second degree, as furthering the final achievement of utilities satisfying human want.

‡ For the advantages of division of employments see Rae's *Principles*, pp. 164 165; and for the disadvantages see pp. 173, 174. Also, see pp. 177 and 408 on Rae's

constant effort of capitalists, therefore, is to integrate and *simplify industry* and to introduce new methods which make a saving in time. These ends are being attained, now here, now there, by material and immaterial inventions, as a constantly recurring phenomenon. This aspect of invention is quite as prominent in Rae's handling of the subject as the discovery of new mastery over materials (*e.g.*, the ability to utilize some hitherto waste product) or the making of those improvements which save labor without shortening the duration of a process.

Another way of bringing out the difference between Rae and Böhm-Bawerk in respect to the subject in hand is to note that Böhm-Bawerk (as he himself recognizes) concentrates his attention on the formation of the apparatus of capitalistic production in contrast to Rae's emphasis on the functioning ("exhaustion") of the apparatus when formed. The one keeps before his readers a picture of the total production process of society, whereas the other makes prominent the separate branches of that process; and this difference in the initial point of view respecting production is an additional reason why our authors conceive of the nature and effects of progress in production in wholly different fashion. With the development of the arts attending the advance of society from one stage of industrial civilization to another — a fact of the category of *Culturgeschichte* — there comes about, indeed, a more "time-robbing" total production process,— a more "roundabout" system of production as a whole. And for this very reason, Rae would say, in agreement with Böhm-Bawerk up to this point, no advanced industrial civilization is possible without a high development of the "accumulative principle" in a people. A tribe of Indians possessed of a fair knowledge of the beginnings of the arts could not advance at a bound to our long-drawn-out, serial method of production (perhaps they never could attain to it), because, even though nothing else were lacking, their effective desire of accumulation would not bear the strain. But he would urge, and here he parts company with Böhm-Bawerk, that the advance of the arts in any

position as to "exchange,"— a phenomenon which increases "as the number of instruments increase" and the steps in the process of their "formation" are multiplied, but the necessity of which "is a circumstance retarding the increase of stock."

one stage of the development of civilization — a fact of a more strictly economic category — does not necessarily mean in general the substitution of more roundabout individual processes for those which are less so, but, as a rule, quite the opposite. It means that in each separate branch of industry results usually come more quickly, and there is consequently a lessened strain on the effective desire of accumulation of the society.

Böhm-Bawerk seems to be of the opinion that only an epoch-making innovation in the arts, such as the original discovery of the wheel or its later application to railways, deserves the appellation of "invention." Minor improvements, even though not inconsiderable in scope, in the adaptation and recombination of known devices, he apparently regards as different in kind from true inventions. In a notable passage in the *Positive Theory* (p. 86) we read that extension of capitalistic processes of production "by the adoption of a steam motor, or an apt transmitter, or some ingenious gearing, blast, lever, regulator, or the like," is the sort of thing which may take place in our society "without any new invention." Now the line cannot be drawn in this manner between more and less. In the philosophical treatment of this subject, anything is an "invention," and of full significance as such, which is not an "imitation." Inventions, innovations of any degree, brought out under some peculiar local conditions, are propagated by imitation throughout the civilized world, and then, as the result of contact with fresh social and physical environments, give rise to fresh invention and renewed imitation. In some instances new imitations (and hence in the end new inventions) may be impeded by inertia or some artificial cause; and therefore, in Rae's opinion, the economic desirability of promoting the imitation of foreign arts in a new and poor country by a protective tariff. Again, in other instances, the process of imitation may be too rapid for the ultimate attainment of the maximum progress of society; and, therefore, the *raison d'être* of patents to retard imitation and to enable the inventor to reap a sufficient reward for his inventing. Progress in the industrial arts, the growth of economic institutions (such as banking), the expansion of our whole material civilization, are but particular phases of the general sociological

principles of invention and imitation — first conceived of and expounded by Rae.

And now to pass briefly in review Böhm-Bawerk's criticism of Rae. The characteristic feature of this criticism consists in urging, now in one form, now in another, that Rae failed of solution of the problem of the rate of interest, because he failed to perceive that the technical returns — the physical surplusses (*Mehrerfolge*) — of capitalistic operations is not the same thing as the immaterial gains of surplus value,— the true "profits" (*Gewinnsätze*, *Mehrerträgnisse*). This keen-edged weapon has been employed against many another opponent, commonly for the purpose of showing that they had no basis for the emergence of interest, rather than for the purpose of demonstrating that their account of the variation of the rate of interest was in error. That this would be Böhm-Bawerk's chief method of attack on Rae was indicated some time ago in his brief comment in the *Zeitschrift für Volkswirtschaft.**

In the fully developed criticism now before us it is maintained that Rae used the term "capacity" of instruments in two senses,— sometimes to mean the power of producing "utilities" satisfying human want and capable of physical measurement, and sometimes to mean profit-earning power. Now the power of capital goods to produce a physical product or quantity of utility measured by some physical test, does not work at all on the same lines as its power to produce an excess of exchange value in the product above the value of the costs (outlay); and hence Rae's error and shortcoming. In some aspects of his theory, indeed, Rae takes sufficient cognizance of both the distributive-psychological and the productive-technical elements of profit, and their relation to each other; but, in general, he is remiss.

Thus "Rae proposes to explain the fall of the rate of interest under increasing accumulation of capital by the necessity of resorting to materials of greater difficulty of manipulation with which instruments of equal 'efficiency' can be produced only at greater cost." But the instruments or products of instruments ("for example, a hundred-weight of

*Vol. VIII. p. 111, note.

sheep's wool or corn") thus formed at a greater cost of "direct and indirect labor" than before, will attain, according to Rae's own cost-of-reproduction theory of value, a corresponding increase of value in exchange; and this increased "sum of values" in the product will completely offset the increased cost of attainment of the product, since "it is not made evident or even probable by any feature of Rae's theory that the value of the product will increase in a smaller proportion than the increase of costs." Therefore, Rae does not make it appear why the general rate of profit should fall from the cause assigned.

"On this point Ricardo saw further. One will easily recognize in Rae's train of thought the reference to that same 'law of diminishing returns' by means of which Ricardo sought to explain the tendency of interest to fall. Rae, however, gave to this law a somewhat more universal, abstract meaning, in that he always spoke of the necessity of going over to more thankless 'materials': whereas Ricardo, with a more concrete conception, pointed out only the most important manifestation of the law,— namely, the necessity of resorting to ever more thankless *pieces of land.* But Ricardo had very correctly kept in mind that the increase of the amount of labor, which must now be applied to the creation of the same amount of product, in no way diminishes directly the profit of capital; that, rather, the value of this amount of product must then rise, and exactly in the same proportion as the amount of labor necessary for its creation has risen; and that, finally, only because under the given conditions the *wage of labor* must also rise, does the surplus of the slightly increased value of product over the considerably increased costs of production diminish, and with it the rate of profit fall. This argument (which, indeed, as we have seen, does not lead to the goal) is, however, unknown to Rae, who intentionally and expressly in his exposition treats the wage of labor as a given and unchanged quantity." *

* *Geschichte*, pp. 415, 416.

Rae's performance was greater than his promise on the subject of the wages of labor. Notwithstanding that he announced that "wages" (along with "rent") was one of the divisions of economics with which he would not deal, there are several places in his work where he indicates clearly how labor and its com-

In reply to this argument, as a whole, it may be said that precisely because Rae gave to the law of diminishing returns a more universal meaning than did Ricardo, his theory of value or any theory of value cannot be used against him to prove that his account of falling profits is invalid. In the case of increased resistance of nature in the production of wheat — increased costs of production — the exchange value of that particular commodity will indeed rise correspondingly, and there will be in the first instance no cause for a fall in the farmer's profits. The effect of diminishing returns from wheat-raising lands alone can be so diffused as to bring down general profits, and thus, in the end, by the law of competition, the farmer's profits, only through the general rise of wages assumed by Ricardo as consequent upon the increased exchange value of wheat. But when one represents, as does Rae, that with expanding investment there may be an increased resistance of nature respecting materials or the uses of "land" all along the line, then this cause of greater costs of production produces its effect on profits, not through wages or any other medium, but directly; and it cannot be offset in any degree by a general improvement in the market values of products. A general rise of values is impossible.

"And it is no better," Böhm-Bawerk proceeds to say, "with the clarifying power of what Rae brings forward concerning the connection of new inventions with a rise of profits. If it becomes possible, by means of a brilliant discovery, to produce a tenfold technical product with the same labor, then (the case of a monopoly excepted, which Rae also does not consider) it does not at all follow that the product represents a tenfold greater sum of value and leaves a tenfold greater excess over the natural value of the instrument concerned, thus moving it so much further forward in the scale of profit-earning capacity. On the contrary, again in consequence of a doctrine expressly brought forward by Rae in his theory of value (p. 168), the value of the product will sink to the level corresponding to the decreased labor cost; and it is accord-

pensation are related to the general problem of the rate of profits. It was mainly for the purpose of constructing his "orders" of capital goods to make comparison of the effective desire of accumulation at different times and in different societies that he specifically assumed the wage of labor to be a fixed quantity.

ingly again not made evident that, with such a proportional decrease of value [of product] and costs, the difference between the two (which comprises the profit on capital) does become greater than before, or why it should."

Again I answer that in the case of a single invention (or several inventions affecting one set of instruments) the value of the increased product is indeed soon reduced in the market, and thus the gain from the invention is distributed to all the consumers of the product in the form of higher real incomes. But in the case of a general introduction of labor-saving inventions (or the diffused effect, on instruments in general, of one important invention) each set of producers gets the benefit by having an increase of its own product to exchange for other products without any fall in value. There cannot be a general fall of values. As these increased products belong to the employer-capitalists, they constitute an increase of profits on capital which is effaced only in time through the effects of fresh accumulations of savings.

"In the case of inventions," Böhm-Bawerk continues, "the fall of value of the article affected by the invention is, after all, so striking and notorious a phenomenon that Rae could not avoid taking notice of it. The particular passage — of about sixteen lines — where he does this is therefore especially noteworthy, since it is the only one where, even in the most laconic manner, he attacks the really critical point of the interest problem. He remarks, namely, that the effects of improvements are indeed felt 'immediately and in the first instance' by the improved instruments, 'but very soon spread out over the whole mass of existing instruments in the possession of the society.' And now follows the example already cited above (p. 400) of the technical advance in bread-baking, which brings to the bakers only 'a small increase of their profits,' but to all the members of the society a cheaper bread, and thus for the same outlay brings in a somewhat greater return, and, consequently, moves all the instruments in the possession of the society into a class of greater profit-gaining power (*Rentabilität*)." *

In making the statement that the bakers would have left

* Page 417. The passage in Rae's *Principles* here referred to is on p. 259.

over "a small additional profit," after the primary readjustment of the value of bread is completed, Rae touches, in Böhm-Bawerk's opinion, "that point which in an interest theory having a specific aim must stand at the centre of the explanatory attempt. Why, if there is a levelling law of costs, should the levelling competition stop at a point which still stands above the costs?" * Apparently, Rae thought, Böhm-Bawerk observes, that the supposed general rise of profits following the invention in baking gave support to this particular rise of profits for the bakers. "If it were true that the fact of a cheaper purchasing of bread for all other branches of trade meant a direct raising of their profits of capital, then it would be actually conceivable that in that case the baking trade would need to be satisfied with no lower rate of profit than that enjoyed by all other branches of trade, and that the further pressure of capital whereby the leveling effect of the law of costs works itself out should stop at a point which leaves the baking trade a higher profit than before,— and, indeed, the same profit, which, thanks to the cheaper sale of bread, would now obtain in all other trades." †

But it is not true that the general rate of profits would be raised by the invention in baking, "for exactly the same slight improvement of real exchange value which every species of product except bread experiences, the cost-goods of these other products also experience, including the most common cost-good labor; and there thus appears exactly the same kind and the same degree of increase of value on both sides of the scale,— on the side of costs, on the one hand, and of 'profits,' on the other hand,— and it is absolutely inconceivable how this state of things can give rise to an increase of the excess of profits over costs." ‡ In other words, according to Böhm-Bawerk, there would be a general levelling up of the value of the capital-goods and of labor, or a recapitalization of the plant and staff of society, exactly neutralizing the initial rise of profits,— an argument which is the converse of the general levelling down of the value of the products of capital commented on above.

But although, according to this representation, the "small

* Pages 419, 420. † Page 420. ‡ Page 419.

additional profit" of the bakers receives no support from any possible general rise of profits growing out of the cheapening of bread, "a support is, indeed, at hand (and thereby Rae's theory as a whole is advantageously distinguished from the pure productivity theories) in that the competition can never level the price of bread to the amount of its own costs,—to the mere restitution of the amount laid out in wages and the like,—which is guarded against in the pure psychological motives and forces belonging to the 'first train of thought' (see above, p. 404) in Rae's theory as a whole."

But, after all, it appears that this latter feature of Rae's teaching is an adequate support only for the emergence of *some* profit on the bakers' capital. Böhm-Bawerk proceeds as follows: "But for a further stretching of price above the point demanded by the state of these [psychological] forces,—that is, for what Rae in his illustration calls 'a small increase of profits,'— . . . there is wanting any support in Rae's theory." This is the outcome, because "this further stretching should be explained by production-technical influences; but Rae's process of thought, which here moves in the footsteps of theorizers of production, is not able to account for its enduring state." *

Rae, however, never attempted to maintain that there would be any "enduring state." The higher profits resulting from inventions — from "production-technical influences" — endure only for a comparatively short interval, only for the space of time during which the accumulative principle is catching up with the technical situation, and so obliterating the general *conjunctur* rate of profit which for the time being obtains. The capitalists of a healthy society, Rae maintains, respond to the high rate of profit on existing instruments by "instantly commencing to work up, into analogous instruments, inferior or more stubborn materials, or by their working up similar materials more laboriously. The amount thus wrought up, until the process stops by the total instruments constructed arriving at an order correspondent to the effective desire of accumulation of the society [*i.e.*, by the restoration of the old standard rate of profit], must depend entirely on the nature of these ma-

* Pages 420, 421.

terials, and is, therefore, always a variable quantity, and one never to be ascertained previous to the event. Sometimes a very small improvement may put a large range of materials within reach of the accumulative principle. Sometimes a very considerable improvement may not enable it to make much addition to the stock before constructed." *

The state or condition which exists in respect to capital and its earnings previously to the closing of the gap created by recent inventions, Rae calls a state of "increase of absolute stock." While this condition lasts, the "actual order of instruments" is the "active agent" (Böhm-Bawerk's term in a similar connection) in place of the "effective desire of accumulation," which determines the prevailing or market rate of profit. Rae worked out this doctrine thoroughly,† and Böhm-Bawerk himself takes note of it more than once in his exposition and criticism of Rae.

I am at a loss to understand why one who has such a complete grasp of Rae's "theory as a whole" can, nevertheless, continue to urge again and again inconclusive objections to particular parts of it, unless it be by reason of confusion of thought growing out of a one-sided theory of value. I am the more convinced that this is the explanation of Böhm-Bawerk's adverse criticism of Rae, in view of the nature of his last argument in refutation of him,— a sort of blanket argument covering both his account of rising and of falling profits.

We read: "This brings me to a last point of view from which — and perhaps most simply and clearly — Rae's failing can be seen. All advantageous and disadvantageous changes in the technique of production, which Rae deduces, on the one hand, from happy inventions, and, on the other hand (in case there are none such), from the necessity of resorting to the working-up of less favorable materials, work out in the last analysis to changes in the *productivity of labor:* a like

* *Principles*, p. 262. If Rae had had the phenomena of the savings-market and pure interest before his mind, he would have expressed himself somewhat differently. He would have said that in the supposed situation the supply of savings starts forward by leaps and bounds until the marginal increment is offered at the old rate of interest to *entrepreneurs*, again on the accustomed margin of production, who can give only the old rate.

† See in particular *Principles*, pp. 172, 173, 260, and 263.

quantity of labor is able in the first case to obtain a greater, in the second case a smaller, technical result; it is, therefore, in the first case more productive, in the second less productive, than before. (Rae himself expresses it, that the inventive faculty 'must render the labor of the members of the society more effective.' p. 258). But Rae [through his theory of the value of commodities] has all instruments which are affected by this change in productivity suffer changes in their value (be it their use-value or their exchange-value), only labor alone does not; whether it performs because of the happy invention twice as much, or because of the exhaustion of the most suitable materials twice as little, for the satisfaction of human needs as before, there shall never result any change in its own value. The value and wage of labor is treated by Rae (through an expressly pronounced hypothetical supposition applicable to the whole realm of his theoretical investigations) as a given, unchangeable quantity. That could be granted if his theoretical aim were directed to something else than to the explanation of the formation of values [of goods] (*Wertbildungen*), which stand to the value of labor in a relation of reciprocal influence; but it was an irreparable deadly sin of method, if the formation of the differences in the value of goods as opposed to the value of labor — and the interest of capital is, indeed, according to him nothing else than this — should constitute the subject-matter of his explanatory undertaking. Obviously, the increased productivity of labor, *caeteris paribus*, must influence its value — be it use-value or exchange-value — through the same causes and in the same direction as it influences the value of products made by labor; and just as obviously is a theory wanting which explains the formation of an interval between two quantities moved in the same direction, simply by supposing the movement of the one to be unrestrained, whereas that of the other, subject to the same cause of movement, is fixed by virtue of an arbitrary and wholly unsupported hypothesis." *

The present writer, going one step farther than Rae,† can

* *Geschichte*, pp. 422, 423.

† "I may . . . observe that, though for the sake of simplicity of exposition I have assumed, all along, that the wages of labor constitute an invariable quantity, I yet conceive that, in a society making a steady and healthy progress, they

readily admit, on the basis of the theory that labor is the "residual claimant" in industrial society, that ultimately the benefit of invention is perhaps entirely taken up by wages, either in the form of higher wages for the same number of laborers or in the form of the same wages for a larger number of laborers. The old "wages fund" theory needed this modification, and some others, to broaden it and make it hold strictly true. But it is impossible to admit a "productivity" theory of wages as utterly invalidating the "wages fund" theory, and as proof that the total benefit of inventions is straightway absorbed by wages. Wages, both total and individual, are, in a healthy society, gradually raised, in consequence of an important invention, by the resulting increase in the accumulation of capital, since part of that increase must necessarily be wage-paying capital. But this process takes time; and not all the increase of stock functionates as wage-paying stock, but as furnishing increased real incomes for other members of the community. Therefore there is room in any case for a shock of invention, so to speak, to raise profits proper and interest for a considerable period before its effect is wholly transmitted to wages.

What has been called a shock of invention produces, in contrast to the effects just described, certain relatively permanent displacements. There is, first, an increase of the total capital of the community as expressed in terms of some supposedly invariable common denominator of value,— what Rae calls an "increase of relative stock." There is, secondly, a raised standard of living, provided the initial change in material circumstances is sufficient in extent and duration to make an impression on the habits of the people. There is, last, an increase of the power of the society affected, economically and otherwise, relatively to other communities.* These final results, when made considerable by repeated shocks of invention, are effaced or levelled down only by processes exceed-

should rather be continually increasing, the laborer as well as the capitalist gaining something by the improvements which the progress of invention produces." *Principles*, p. 327.

*"It can support the burdens of war, and the expense of all negotiations and national contracts with foreign powers, with greater ease." *Principles*, p. 260. Rae makes this statement with reference to the initial effects of industrial invention rather than to the final effects, but it holds equally in either case.

ingly slow, analogous to the "erosion" which reduces the mountains cast up by the convulsions of nature.

In closing, I wish to acknowledge my indebtedness to the author of the *Positive Theory*. Indeed such had been the accumulation of able error and half-truth for many generations on this unfortunate subject of capital, that it would have been impossible to appreciate Rae or any other profound writer, were it not for the distinguished services of Böhm-Bawerk. But these services consist mainly in bringing us to the present point. To take now, as a new guide, the earlier great investigator of capital, is not to turn back, but to pass on.

CHARLES W. MIXTER.